Statistical Reasoning: Here’s to Your Health!

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Office Hours: MWF: 11:00-12:30, TTh: 2:00-4:00 and by appointment

Course Description:

Statistical Reasoning: Students will gain an understanding of how decision making is accomplished using modern statistical techniques. Topics include descriptive statistics, graphical methods, elementary probability, estimation, and statistical inferences.

Perspective: Natural World

Specific Area of Inquiry: Students will apply the techniques of data analysis to data sets and statistical studies that deal with health related issues.

Course Objectives:

Students will become savvy consumers of statistical information presented in the media with a particular emphasis on health related claims. In order to evaluate the merit of published information, students will learn how data should be summarized numerically and graphically. Students will understand the power and, perhaps more importantly, the limitations of basing a health (or any type) claim on just a sample from the population of interest. Students will be prepared to analyze sample data sets and communicate appropriate conclusions as well as evaluate and critique published statistical findings.

Intended Learning Outcomes: By the end of this course, successful students will be able to ...

... use the methodologies of statistics to investigate a topic of interest and make decisions based on the results.

... use the methodologies of statistics to design and carry out a simple statistical experiment.

... use the methodologies of statistics to critique news stories and journal articles that include statistical information.

... articulate the importance and limitations of using data and statistical methods in decision making.

... express themselves clearly and effectively in writing using the concepts and language of statistics.

... articulate the importance of the methodologies of statistics for understanding health related issues.
Course Materials:

Primary Statistics Text:
A First Course in Statistics, McClave and Sincich RC custom edition

Supplementary Reading:
News and Numbers- A Guide to reporting Statistical Claims and Controversies in
Health and Other Fields, Victor Cohn and Lewis Cope 2nd edition

Writing Reference
A Writer’s Reference, Diana Hacker RC Custom Edition

New York Times on-line Health Section
Various magazines and newspapers available in Fintel Library
Health Datasets from STARS: Creation of Statistical Resources from Real Datasets website
Minitab statistical software package
Scientific/calculator

Classroom Policies:

Cell phones must be turned off and put away prior to entering the classroom. In the unlikely event that you need to turn on your cell phone during class, you must have permission of the instructor to do so. Otherwise, anyone using a cell phone for any reason during class is subject to being dropped (DF) from the course.

The only electronic device that may be used in the classroom is a calculator (cellphone calculators not allowed). Use of laptops may be permitted occasionally, but only for specific assignments.

Attendance Policies:

Full attendance is expected. As stated in the Academic Catalog, “Every student is accountable for all work missed because of class absence. Instructors, however, are under no obligation to make special arrangements for students who are absent.” Also, anytime you come in late or leave during class you miss part of the course and you disrupt the educational experience for everyone else. Do this only in the case of emergency.

Quizzes/Tests/Exams:

There will be frequent quizzes on homework and readings. There will be no make-up quizzes, but the lowest 2 grades will be dropped.

There will be 3 tests on basic statistical techniques and readings. Anticipated dates are: Sept. 11, Oct. 7, and Nov. 18
Make-up tests will be given only under very extenuating circumstances that prohibit you from physically appearing in the classroom.

The comprehensive final exam will be on Monday, Dec. 14 at 8:30 am.
Assignments:

“Weekly” Writing: (Individual Assignment) Short writings will be due on the following Wednesdays: Sept. 2, 9, 16, 23, 30, Oct. 21, 28, Nov. 4, 11. Students must complete 6 of the 9 assignments. Writings will be based on health related articles published during the semester. Each writing will include the date and citation of the article chosen by the student along with a brief review as guided by instructions given in the assignment. A final (7th) writing will compare, from a statistical reporting point of view, the “best” and “worst” of the 6 articles reviewed by the student.

Statistical Experiment: (Small Group Assignment) Design and carry out a simple study related to a health issue.

- Write a “scientific” report of findings.
- Poster for in-class gallery walk

Public Service Announcement: (Small Group Assignment) Produce a video in the style of a public service announcement regarding a health issue. The message of the announcement must be supported by solid statistical research. The research must be mentioned in the video and justified in written form.

Homework: Practice problems from the primary text and assigned readings from supplementary text. Analysis of additional health related datasets.

Course Outline

Statistical Text coverage:  
- Sept. 11  Test 1 – Chapters 1 and 2  
- Oct. 7  Test 2 – Chapters 3 and 4 though section 4.6  
- Nov. 18  Test 3 – 4.8 through Chapter 6  
- Dec. 14  Final Exam – all of above plus Chapter 10

Other Important Dates  
- Oct. 9  PSA Video Due  
- Dec. 2  Statistical Experiment Report and Poster Due

Daily Schedule to be posted and updated on Blackboard website

Academic Integrity The College policy is fully supported. All tests and quizzes are closed book and closed notes. Each writing must be in each student’s own words. Collaboration between groups is not allowed for the statistical experiment report and poster nor for the public service announcement video. Collaboration is allowed on other homework.
The Math, Computer Science and Physics department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our disciplines. Dates and times will be announced later.

Members of this class are encouraged to be involved with all of these meetings; however participation in at least one of these sessions is mandatory. A response form is available in Blackboard as a Course Document. Within one week of attendance, students must submit this completed form to the instructor.

**Grading Policy**

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<tbody>
<tr>
<td>Homework Quizzes</td>
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<td>Tests (15% each)</td>
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<tr>
<td>Writings</td>
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<td>Statistical Study Report</td>
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<td>Statistical Study Poster</td>
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<td>Public Service Announcement Video</td>
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<tr>
<td>Final Exam</td>
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**Course Averages:**

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**Note:** Material, content, and scheduling are subject to change if deemed appropriate or necessary by the instructor.